

## **Middleton Railway Trust Ltd.**

### **Risk Assessment for Lifting Operations.**

The framework within which this risk assessment for lifting operations has been made is described in a separate document, which notes that the basic structure is unchanged from the initial assessment that was made in 1994. Thus, the assessment is in three parts:

- the first part consists of an outline of the hazards, in terms of the different groups of people involved;
- the second part discusses the allocation of a score to each; and
- the third part provides a summary and conclusions.

The reason for creating this document is the recognition that the overall risk assessment dated 2006 did not go into enough detail of the risks associated with lifting operations that involve lifting equipment such as cranes or jacks. These risks were identified there as coming within the group covering railway staff and other engineering activities, and were discussed under the heading of work on or around the permanent way (4.1). The specific hazard that was identified in this group was “Because of the weight of most permanent way components, damage can result from accidents when lifting or handling them.” (4.1.2), but it was also identified that similar hazards could arise in work on the rolling stock, viz “those arising from the weight of the components being handled” (4.3.1).

Specifically, the analysis of hazard 4.1.2 simply said that “This hazard also applies to any handling of other large heavy components, and to minimise the effect of their weight, and in accordance with the principles of the Manual Handling Regulations, suitable lifting equipment (which includes a rail mounted crane) is used whenever rails or sleepers need to be handled. Of course, any such equipment has its own risks, and not just cranes, although they have particular risks which are recognised as being more severe than those associated with simple equipment such as jacks.”

It then went on to say that “To minimise the hazards associated with the operation of cranes, such operation is restricted to a small group of the most experienced members so as to ensure the competence of those concerned. Care is also taken to ensure that lifting equipment is only used within its load limits, including the use of suitable weighing equipment for heavy lifts. Also, all lifting machinery is tested as necessary in accordance with normal practice to eliminate the possibility of mechanical failure. Thus, the risk associated with the use of lifting equipment is essentially that of operators making an unusual error, which thus has a score of 2. The score for the severity has to be 3 or even 4, so that the overall score for these sort of operations is 6 to 8.”

This therefore omits a number of more specific hazards that need to be identified, as follows.

#### **Part 1 - Outline of Hazards**

When any piece of lifting equipment is in use, it forms part of a system, and to analyse the hazards that may arise from a lifting operation one has to consider the following components of the system:

1. the equipment itself,
2. the base on which the equipment is standing,
3. the load which the equipment is lifting,
4. the operators of the equipment, and
5. other staff involved in the work which is associated with the lifting operation.

Each of these components therefore gives rise to a particular set of hazards, as follows.

1. Hazards arising from failure of the equipment itself.
2. Hazards arising from failure of the base on which the equipment is mounted, such as failures of the sub-formation or track on which a rail-mounted crane is standing.
3. Hazards arising from the load which the equipment is lifting, and in particular from possible instability of the load, which may result in it tipping or slipping during the operation.
4. Hazards arising from errors by the operators of the equipment, or arising from any of the above kinds of occurrences.
5. Hazards to other staff involved in the work from any of the above kinds of occurrences.

Each of these various sets is considered further below.

#### **Part 2 - Assessment of Individual Hazards**

This assessment uses the same numbering as part 1.

##### **1. Hazards Arising from Failure of the Equipment Itself**

These hazards can arise either from overloading of the equipment or from mechanical failure of it, and were both analysed in the previous assessment. As identified there, they are controlled by training of the operators, by the adoption of procedures that include the weighing of heavy loads, and by regular testing of lifting equipment. The combination of these is sufficient to justify giving a score of 1 for the risk, and (as discussed above) the score for the severity has to be 3 or even 4, so that the overall score for these hazards is 3 to 4.

## **2. Hazards Arising from Failure of the Base for the Equipment**

These hazards were not identified in the previous assessment, and they take two forms. One form is where instability of the base leads to the possibility of the equipment itself overturning, as might happen if a rail-mounted crane were being used on track that had not been properly packed. The other form is where either the load or the lifting equipment are being supported on packings that are inadequate, leading to the possibility of the load dropping.

The most significant control measure for hazards arising from possible instabilities of the base is the training of the operators of the lifting equipment, to ensure that for every lift they make a careful judgement of these possibilities, and of the likely consequences of a failure of the base. Where the failure mode is likely to be simple subsidence of the equipment and load, such as when jacking track, then the severity of the hazard is low and further control measures are not needed. For such operations the score for the risk may be quite high - say 3 - but the score for the severity only 1 or 2, so that the overall score for these hazards is between 3 and 6.

Where the failure mode may be more severe, however, such as the possibility of a crane overturning, then control measures are required to stabilise the base, for instance by packing track before attempting to crane from it, or by placing wooden packings to help spread the load, particularly for those cranes that have outriggers. Alternatively, the lifting operation must be re-planned so as to use a different configuration of lifting equipment that will involve a much lower risk of these hazards arising. Because the score for severity for such a failure has to be 3 or even 4, these control measures must be sufficient to reduce the score for risk to 1, giving an overall score for these hazards of 3 to 4.

For hazards that can arise from the use of inadequate packings, the control measure is simply to ensure that whenever packings are used, either to support lifting equipment or to support loads, then the packings must be of adequate strength and there must be more than enough of them. The importance of both of these is part of the training for those who will be operating lifting equipment, and in particular this training emphasises that if there is any doubt about the quality of a wooden packing then it must not be used, and instead an alternative must be found that is more substantial. It is also emphasised that if a wooden packing is not considered to be of adequate quality for the kinds of loads that it might be expected to carry, rather than just not being big enough, then it should be burnt, to avoid any possibility of it being used by mistake. Here again, because the score for severity for such a failure could potentially be 3 or even 4, these control measures must be sufficient to reduce the score for risk to 1, giving an overall score for these hazards of 3 to 4.

## **3. Hazards Arising from Instability of the Load**

These hazards were not identified in the previous assessment, and again they take two forms. One form is where the load itself is liable to collapse in some way during the lift, as for instance where a bundle of sleepers is being lifted with slings, which might result in at least part of the load falling. The other form is where the lifting equipment can not be attached securely to the load, as for instance where rails are being lifted with a chain sling, so that the sling may move along the length of the rails, which again may result in at least part of the load falling.

It is in the nature of lifting operations that the risks of such hazards can not always be eliminated, and so the focus of control measures has to be on minimising the severity of such a hazard if it should occur. This primarily involves those carrying out the lift considering carefully what instabilities might arise, whether there is any action that can be taken to make them less likely, and what the potential consequences of such a hazard might be. For instance, when lifting rails a piece of timber can be placed inside each loop of chain that is round the rails, so that the chain can bite into this and will then be less likely to move along the rails. The most common control measure is, however, to consider where and how a load might fall if such an instability occurs, and then ensure that all those involved in the lifting operation keep well out of the way of any such possible fall. Since again the score for the severity has to be 3 or even 4, these control measures have to be applied to ensure that the risk is reduced to a score of 1, so that the overall score for these hazards is 3 to 4.

## **4. Hazards Arising for Operators, or from Operator Error**

The previous assessment identified hazards arising from operator error as being sufficiently common to require a score for risk of 3. While this was mainly in the context of operations that did not require mechanical lifting equipment, so that loads were lighter and therefore the score for severity either 2 or 3, this still gave an overall score for these hazards of 6 to 9.

For operations that require lifting equipment, the previous assessment noted that "To minimise the hazards associated with the operation of cranes, such operation is restricted to a small group of the most experienced members so as to ensure the competence of those concerned". For jacks and other lifting equipment the restrictions are not quite so strict, but do include the need for any lifting operation to be supervised by the engineer in charge of the work concerned. Hence, as in the previous

assessment, the main risk is essentially that of operators making an unusual error, which has a score of 2, and since the score for the severity has to be 3 or even 4, the overall score for these hazards is 6 to 8.

## **5. Hazards Arising for Other Staff**

These hazards were not identified in the previous assessment, and they all arise from the possibility that if either a piece of lifting equipment or its load falls, for whatever reason, then any person who may be in the way of whatever is falling is likely to be injured. As discussed in sections 1 to 4 above, the control measures that are taken to minimise the risk of such occurrences can not eliminate them entirely, as indicated by the various scores for the risk being in the range 1 to 3. Since the scores for the severity have to be 3 or even 4, the overall score for these hazards would be in the range 9 to 12, so that additional control measures are required for these hazards.

This additional control measure consists simply of ensuring that all staff involved in lifting operations of any sort consider carefully their personal positioning at every stage of the operation, so as to ensure that if there is any kind of failure, they will not be in the way of whatever may fail or fall. Furthermore, the responsibility is placed on the person in charge of each lifting operation (which for craning operations is the appointed slinger) to check, before giving any signal to start the lifting of the load, that all other staff are in positions of safety, so that they can not be injured in the event of any failure of the lifting operation.

## **Part 3 - Summary and Conclusions**

A more detailed assessment has been given of the risks arising from lifting operations, and particularly those involving the use of lifting equipment. This has identified a wider range of hazards than the previous assessment, and has discussed a more comprehensive set of control measures. In particular, it has identified those aspects where judgements need to be made for each separate lifting operation, to ensure that the risks of hazards such as failures of the base on which the lifting equipment stands or failures of the load itself are kept sufficiently low to be acceptable.

A. J. Cowling, 22nd October, 2014.